تم الرفع بواسطة
م. معن أبو عيسى

(10 - 11)

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هندسة كهربائية

PTU

Faculty of Engineering

Engineering Economy

First Exam

Second Semester 2011/2012 Date [redacted] 22/5/2012

Q1) Answer the following statement with true or false: (5 Points)

1. ---T---Interest rates are always expressed as a percentage over an annual time period.
2. ---T---When interest is compounded annually, the amount of money accumulated in one year is not the same under either a simple or compound interest scenario.
3. ---F---A company's minimum attractive rate of return is generally equal to the rate of return obtainable on a bank savings account.
4. -T --In the interest formulas, a simple interest can be used in any of the single payment formulas as long as the n values correspond to the interest period.
5. ---F--- In calculating the present worth of an arithmetic gradient series, the only difference between an increasing and a decreasing gradient calculation is the minus sign for the base amount.
6. ---F--- In solving from an unknown interest rate involving only the F/P formula, it is possible to solve for i directly by rearranging the equation.
7. --T- -- If you multiply the A/P, P/G, and *F/A* factors together, you will obtain the value for the F/G factor
8. ---T-- For a shifted gradient that begins in year four and ends in year 12, the factor (*A/G*, i%, 12) will yield an *A* value in years 1 through 12
9. ---F---A nominal interest rate always has a compounding period equal to or less than a year.
10. ---F---When deposits are made into an account between compounding periods, those deposits do not begin to accrue interest until the next interest period begins.

1	2	3	4	5	6	7	8	9	10
T	T	F	T	F	F	T	T	F	F

6

Q2) Choose the most correct answer: (15 points)

1. A quick, rough estimate of the time required for money to double can be obtained by dividing which of the following numbers by the compound interest rate?
   a. 100 (b) 72 c. 64 d. 52
2. The amount of money five years ago that is equivalent to $1000 now at 10% per year compound interest is nearest to:
   a. $621 b. $667 c. $1500 (d) $1611

3. All of the following are examples of cash inflows except:
   a. Income taxes
   b. Operating cost reduction
   c. Asset salvage value
   d. Construction cost savings

4. When the interest rate is 10% per year, all of the following are equivalent to $5,000 now except:
   a. $4,545 one year ago
   b. $4,021 two years ago.
   c. $5,500 one year hence.
   d. $6,050 two years hence.

5. The equation that is used to calculate a present worth from a single future amount is:
   a. $P = F(1+i)^n$
   b. $P = F[1/(1+i)^n] - 1)/i((1+i)^n)]$
   c. $P = F[1/(1+i)^n]$
   d. $P = F[(1+i)^n] - 1)/i]$

6. The operating cost of a small machine is $800 in year one, $900 in year two, $1000 in year three, increasing by $100 per year through year ten. At an interest rate of 8% per year, the equivalent annual worth of the machine is nearest to:
   a. $1187
   b. $2598
   c. $1149
   d. $7966

7. A young couple wishing to save money for their child's first year in college purchases an insurance policy that will yield $10,000 fifteen years from now. The cost of the policy is $500 per year for 15 years, beginning one year from now. The rate of return on their investment is nearest to:
   a. 3%
   b. 4%
   c. 5%
   d. 6%

8. The length of time required for money to quadruple in value at an interest rate of 6% per year is nearest to:
   a. 12 years
   b. 18 years
   c. 24 years
   d. 30 years

9. An investment of $1,000 per year in years four through ten is equivalent to a single investment in year eleven at an interest rate of 10% per year that is nearest to:
   a. $7716
   b. $8488
   c. $9133
   d. $10436

10. Payments of $1,000 in year two and $4,000 in year five are equivalent to uniform payments in years three through seven at an interest rate of 10% per year nearest to:
   a. $899
   b. $1057
   c. $1177
   d. $3732

11. At an interest rate of 10% per year, expenditures of $1,000 in years zero, three and six could be replaced by a single investment in year eight nearest to:
   a. $3621
   b. $4964
   c. $3964
   d. $5721

12. An interest rate of 1% per month is the same as:
   a. Nominal 3% per quarter compounded monthly.
   b. Effective 12.683% per year compounded monthly.
   c. Nominal 12% per year compounded monthly.
   d. All of the above.

13. When interest is compounded continuously:
   a. The cash flow must also occur continuously.
   b. The cash flow must be converted into continuous cash flow.

c. The interest rate must be converted into an annual rate.
d. None of the above

14. An interest rate of 12% per year compounded continuously is the same as:
   a. Nominal 1% per month compounded continuously
   (b) Effective 1.08% per month compounded continuously
   c. Effective 12.683% per year compounded continuously
   d. None of the above.

15. Income from a certain operation is expected to be zero in years one through five, after which it will be $50,000 per year forever. The capitalized cost of the income at 10% per year is nearest to:
   a. $252300   b. $282250   c. $310450   (d) $500000

9

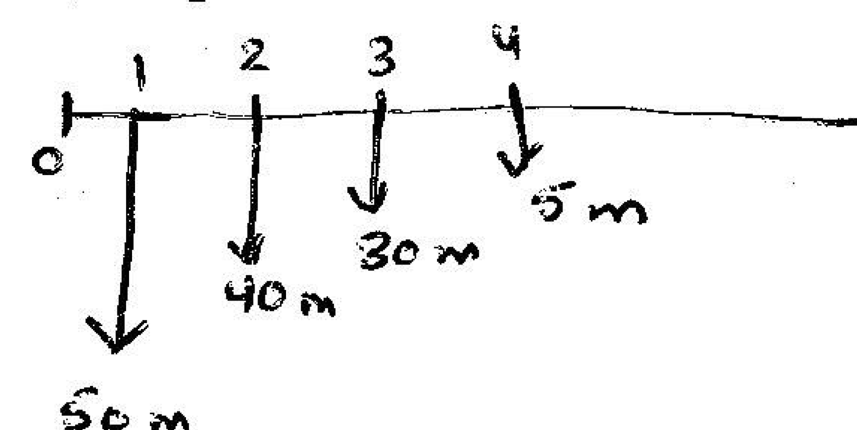
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
b	d	b	c	c	a	c	c	d	b	b	C	a	b	d

Q3) A start-up internet service provider expects to lose money in each of the first four years. Losses are projected to be $50 million in year one, $40 million in year two, $30 million in year three and $5 million in year four. An interest rate of 10% per year is used

a. The present worth of the losses for the first three years is nearest to: (10 points)

P = F (P/F, 10%, 1) + F (P/F, 10%, 2) + F (P/F, 10%, 3)

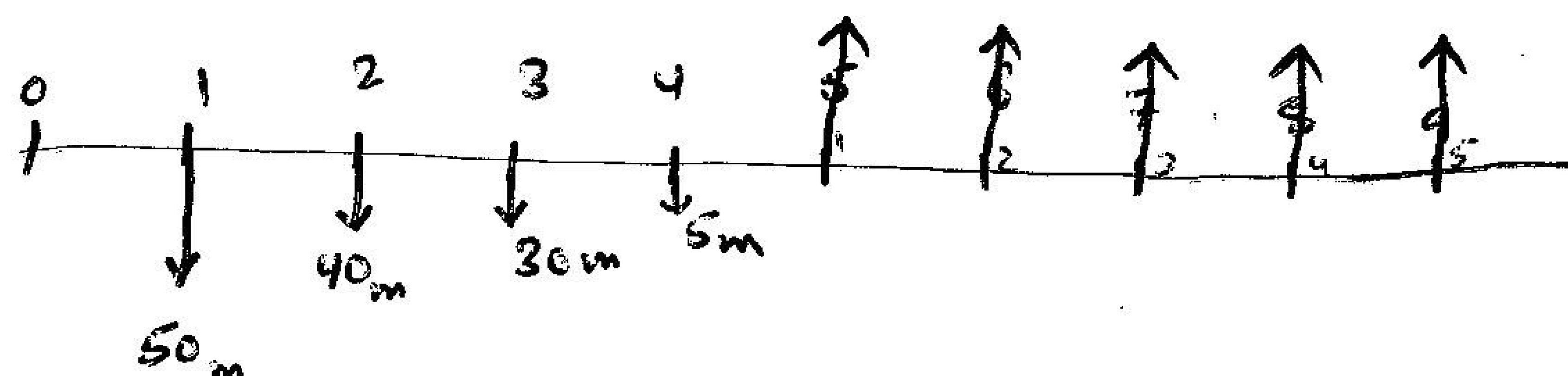
= 50 m (0.909) + 40 m (0.8264) + 30 m (0.7513)



P = 80,759,900

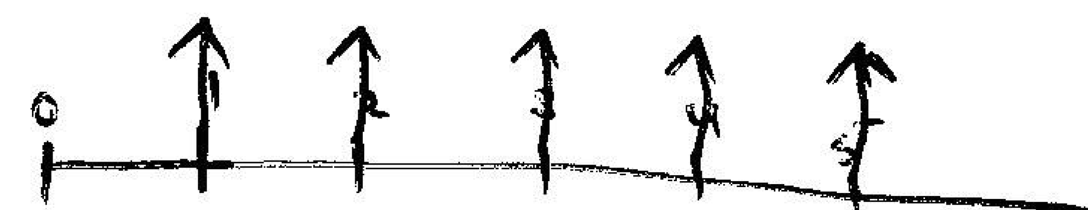
b. In order to recover the losses by the end of year nine, the company's equivalent uniform annual profit in years five through nine must be nearest to:

0.6830



P = 80 759 900 + 5 m (P/F, 10%, 4)

P = 84174900



A = P (A/P, 10%, 5) = 84174900 (0.2638)

A = 22205338

3

Q4) The number of years from now that an initial investment of $1,000,000 would be recovered from uniform receipts of $131,000 per year beginning three years from now at an interest rate of 10% per year is nearest to: (5 points)

$F = P(1+i)^n$

$n \approx 21 + 3$

~~1,000,000 = 131 (1.1)^n~~

$n \approx 24$

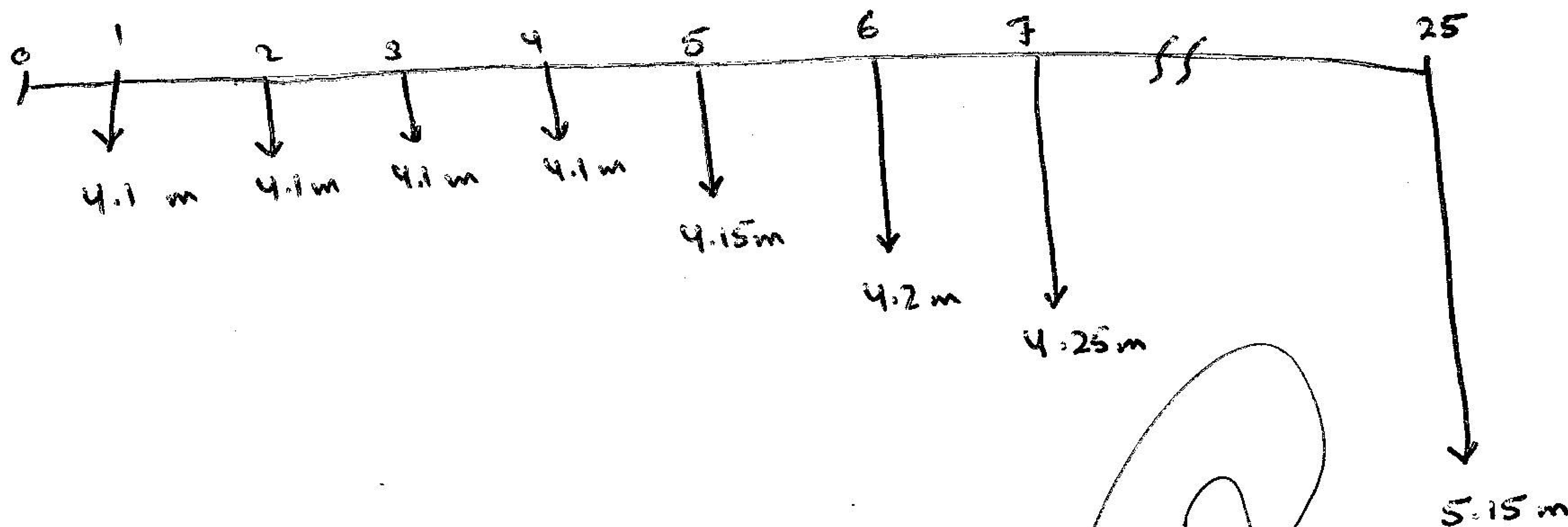
$1{,}000{,}000 = 131{,}000\,(1.1)^n$

$7.633 = (1.1)^n$

2

5) San Antonio is considering various options for providing water in its 50-year plan, including desalting. One brackish aquifer is expected to yield desalted water that will generate revenue of $4.1 million per year for the first 4 years, after which less production will decrease revenue each year by $50,000 per year. If the aquifer will be totally depleted in 25 years, what is the present worth of the desalting option at an interest rate of 6% per year? (5 points)

$i = 6\%$



2

$P = F(P/F, 6\%, 4) + G(P/G, 6\%, 20)(P/F, .06\%, 25)$

$= 4100000(0.7921) + 50000(87.23)(0.2330)$

$P = 4263839.5$